

Claim(s)

1. A chip package, comprising:
a chip carrier having four corner posts mounted thereon and at least one chip attached thereto; and
5 a heat sink including a substantially rectangular base plate with holes therethrough at each of its four corners, said heat sink base plate positioned in thermal contact with the said at least one chip attached to said chip carrier so that respective ones of said at least four corner posts mounted on said chip carrier extend through each of said holes, said heat sink base plate having a
10 notch cut at approximately the midpoint of two opposing sides thereof so as to provide a slot to clamp said heat sink directly to said chip carrier.
2. The chip package of Claim 1 wherein a substantially rectangular heat spreading lid interposes in thermal contact said rectangular base plate of said heat sink and said at least one chip with said heat spreading lid having a corner
15 cut at each of its four corners to accommodate respective ones of said four corner posts and a notch cut at approximately the midpoint of at least two opposing ones of its four sides to provide a slot to clamp said heat sink directly to said chip carrier.
3. The chip package of Claim 2 wherein said heat sink and heat spreading
20 lid are directly attached to said chip carrier by a flexible clip having a holding portion extending over the said rectangular base plate of said heat sink and

through the said notch cuts in each side of said heat sink base plate and heat spreading lid, and a clamping portion extending to the underside of said chip carrier to clamp said heat sink and said heat spreading lid directly to said chip carrier.

5 4. The chip package as set forth in Claim 3 wherein said rectangular heat spreading lid is in thermal contact with said at least one chip by a thermally conductive epoxy and said clamping portion of said flexible clip extends to the underside of said lid to clamp said heat sink directly to said chip carrier.

10 5. The chip package of Claim 1 wherein said heat sink is directly attached to said chip carrier by nuts threaded onto each of said four corner posts to clamp said heat sink and said heat spreading lid directly to said chip carrier.

15 6. The chip package as set forth in Claim 2 wherein said the surface area of said heat spreading lid is substantially the same as the surface area of said chip carrier.

7. The chip package as set forth in Claim 6 wherein said four corner posts are attached to the surface of said chip carrier by a bonding material.

8. The chip package as set forth in Claim 7 further attached to a printed circuit board.

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9. A chip package for mounting on a substrate, comprising:
a chip carrier having four corner posts mounted thereon with a bonding material and at least one chip attached thereto; and
heat sink having a substantially rectangular base plate with holes therethrough
5 at each of its four corners and heat dissipating elements extending therefrom,
said heat sink base plate positioned in thermal contact with said at least one
chip attached to said chip carrier so that respective ones of said at least four
corner posts mounted on said chip carrier extend through each of said holes,
said heat sink base plate having notch cuts in two opposing sides thereof so as
10 to provide a slot to clamp said heat sink directly to said chip carrier.
10. The chip package of Claim 9 wherein a substantially rectangular heat
spreading lid is positioned in thermal contact between said at least one chip
and said substantially rectangular base plate of said heat sink with said heat
spreading lid having a corner cut at each of its four corners to accommodate
15 respective ones of said four corner posts and a notch cut at approximately the
midpoint of at least two opposing ones of its four sides so as to align with
respective ones of said notch cuts in the two opposing sides of said heat base
sink plate, said heat spreading lid having a surface area substantially the same
as the surface area of said chip carrier and positioned in thermal contact with
20 said at least one chip by a thermally conductive and resilient adhesive material.
11. The chip package of Claim 10 wherein said heat sink and said heat
spreading lid are directly attached to said chip carrier by a flexible clip having
a holding portion extending over the said rectangular plate of said heat sink

and through the said notch cuts in each side of said heat sink and heat spreading lid, and a clamping portion extending to the underside of said lid to clamp said heat sink directly to said chip carrier.

12. The chip package as set forth in Claim 10 wherein said clamping portion
5 of said flexible chip extends to the underside of said chip carrier to clamp said heat sink directly to said chip carrier.

13. The chip package of Claim 10 wherein said heat sink and said heat spreading lid are directly attached to said chip carrier by nuts threaded onto each of said four corner posts to clamp said heat sink and said heat spreading
10 lid directly to said chip carrier and said four corner posts.

14. A method of providing multiple forms of heat sink attachment in a chip package;

providing a substantially rectangular chip carrier having corner posts attached to the surface thereof at each of its four corners and at least one chip
15 mounted thereon; and

providing a heat sink including a substantially rectangular base plate with holes extending therethrough, one at each of its four corners, and notch cuts at approximately the midpoint of two opposing sides thereof, said heat sink positioned in thermal contact with said at least one chip so that respective
20 ones of said corner posts on said chip carrier extend through said holes in said base plate and said notch cuts act to provide a slot on each side for clamping said heat sink directly to said chip carrier.

15. The method as set forth in Claim 14 wherein there is provided a substantially rectangular heat spreading plate in thermal contact between said at least one chip and said substantially rectangular base plate of said heat sink with said substantially rectangular heat spreading plate having corner cuts at
5 each of its four corners to accommodate said corner posts on aid chip carrier, said heat spreading plate having notch cuts at the approximately midpoint of two opposing sides thereof aligned with the said notch cuts of said base plate of said heat sink.

16. The method as set forth in Claim 15 wherein a flexible clip is positioned
10 in said slot and extended downwardly to spread over one of said heat spreading plate or said chip carrier to directly clamp said heat sink to said chip carrier.

17. The method as set forth in Claim 14 wherein nuts are threaded to said posts to directly clamp said heat sink to said chip carrier.

15 18. The method as set forth in Claim 15 wherein the surface area of said heat spreading plate is substantially the same as the surface area of said chip carrier.

19. The method as set forth in Claim 18 wherein a flexible bonding material interposes said heat spreading plate and said chip carrier.

20. The method as set forth in Claim 19 wherein said four corner posts are attached to the surface of said chip carrier by a bonding material.